MULTIMEDIA UNIVERSITY

STUDENT ID NO

MULTIMEDIA UNIVERSITY

FINAL EXAMINATION

TRIMESTER 2, 2016 / 2017

PEM0046 – INTRODUCTION TO PROBABILITY AND STATISTICS

(All sections / Groups)

7 MARCH 2017
2:30 p.m. – 4:30 p.m.
(2 Hours)

INSTRUCTIONS TO STUDENT

1. This Question paper consists of **FOUR** printed pages including the cover page.
2. Attempt **ALL FOUR** questions. All questions carry equal marks and the distribution of the marks for each question is given.
3. Please write all your answers in the answer booklet provided. All necessary working steps **MUST** be shown.
4. Statistical table is provided.

Answer ALL questions [100 marks].

QUESTION 1 [25 marks]

a. For the following observations, state whether the concerned variable is discrete or continuous.

i. The time spent by children watching television per day.
ii. Rate of death caused by car accident.
iii. The price of apartment at Bukit Beruang.
iv. The number of staffs over 50 years old. [4 marks]

b. The table below shows the distribution of weights of 60 students.

Weights	Number of students
40.0 – 49.9	7
50.0 – 59.9	13
60.0 – 69.9	15
70.0 – 79.9	15
80.0 – 89.9	10

i. Draw the frequency polygon on the graph paper provided. [4 marks]

ii. Find the median of this distribution. [5 marks]

c. Let A and B be two events defined from the sample space, S, such that $A \cup B = S$. Given that $P(A) = \frac{2}{3}$ and $P(A \cap B) = \frac{1}{4}$. Find:

i. $P(B)$ [3 marks]

ii. $P(A' \cap B)$ [3 marks]

d. The probability function of a discrete random variable X is given by:

x	1	2	3	4	5
$P(X = x)$	$2k$	1/9	2/9	1/9	1/9

i. Obtain the value of k. [3 marks]

ii. Calculate the mean of X. [3 marks]

Continued...

QUESTION 2 [25 marks]

a. It is found that 75% of the foundation students were using Blended Learning Study System in their first trimester. Find the probability, if in a sample of 10 students,

i. less than half of students in this sample use the system. [4 marks]

ii. exactly 6 students are not using the system in their study. [3 marks]

b. A company's toll-free complaints line receives an average of 45 calls per hour. Find the probability that in 5-minute there are

i. no calls received. [3 marks]

ii. exactly 3 calls received. [3 marks]

iii. 5 or more calls received. [3 marks]

c. Given that random variable z follows a normal distribution with mean, 0 and standard deviation, 1. Find the value of z such that

i. $P(-1.41 < Z < z) = 0.7445$ [5 marks]

ii. $P(Z > z) = 0.0233$ [4 marks]

QUESTION 3 [25 marks]

a. The scores of all 6 students in the midterm test are as below:

31 68 75 40 48 52

i. List all the possible samples of size five from this data and construct a sampling distribution of the sample mean. [8 marks]

ii. Calculate sampling error for each sample. [4 marks]

Continued...

QUESTION 3 (Continued...)

b. The height for 1,000 students is approximately normal with a mean of 174.5cm and a standard deviation of 6.9cm. If a sample of size 25 is chosen from this population and the values of the mean are recorded to the nearest integer, determine:

i. The mean and the standard deviation for the sampling distribution of the sample mean. [3 marks]

ii. The probability that the mean height for the students is more than 176cm. [5 marks]

iii. The probability that the mean height for the students is less than the population mean by at least 1 cm. [5 marks]

QUESTION 4 [25 marks]

A student conducts a study to determine whether there is a linear relationship between an individual's weight (in kilograms) and daily water consumption (in kilograms). The data are shown in the following table.

Individual Weight, x	64	91	54	46	64	56	100	70
Water Consumption, y	1.53	2.44	0.91	1.42	1.81	2.32	1.11	0.60

a. Determine the least square regression equation for the data above. [13 marks]

b. Plot the scatter diagram and the least square regression line on the same graph. Hence, describe the relationship between these two variables. [5 marks]

c. Predict the water consumption taken by an individual of weight 67 kilograms. [2 marks]

d. Calculate the linear correlation coefficient and give your comment. [5 marks]

(Leave all your answers in 3 decimal points)

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